

Estimating the risk associated with *Ixodes ricinus* parasitism: towards the development of serological markers for the tick bite

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Ixodes ricinus is the most important ectoparasite in Europe, responsible for the transmission of several pathogens. The characteristics of the tick bite (e.g. absence of immediate symptoms) imply the possibility that part of the infections transmitted by ticks remain occult. It is thus difficult to estimate the actual impact of ticks on the health of human and animal populations.

A tool capable of determining whether humans/animals have been bitten by *I. ricinus* would allow to: determine the actual 'pressure' of the tick bite; estimate the risk associated with tick parasitism; contribute to the diagnosis of diseases such as the Lyme disease, where anamnestic information is frequently lacking.

With the goal of developing markers for the 'diagnosis' of the *I. ricinus* bite, we first focused on *Midichloria mitochondrii*, a bacterium present in all the infecting stages of *I. ricinus*, reaching 100% prevalence in adult females, where it is also observed in the salivary glands. Humans and animals exposed to *I. ricinus* present an antibody response against a recombinant flagellar protein (rFLiD). rFLiD might thus represent an antigen for the serological evaluation of the exposure to the tick.

Seroprevalence for *Midichloria* rFLiD in humans exposed to *I. ricinus* ranges from 30 to 60%. Thus, rFLiD appears promising, but incapable of determining the exposure to *I. ricinus* in approximately 50% of the patients. We initiated a seroproteomic work on *I. ricinus* and *Midichloria* proteins, with the goal of detecting further antigens. Using sera from patients parasitized, collected at the tick removal and after 40-60 days, we characterized additional proteins that determined seroconversion. Work is in progress to develop peptides from the discovered antigens, in order to set-up an ELISA-assay for a first application and validation of this serological tool, on a wide panel of subjects exposed at a different risk of tick parasitism.